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# *Trail Riders Guide* *to the* **BOB MARSHALL WILDERNESS**



*NORTHERN REGION*

*MISSOULA MONTANA*

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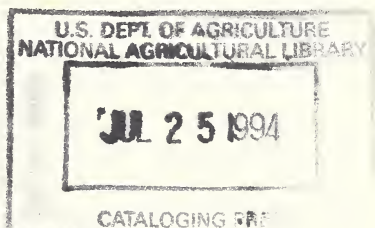
**National Agricultural Library**

The Bob Marshall Wilderness Area, as designated on August 16, 1940 by Act of the Secretary of Agriculture, is a living memorial to Robert Marshall, forester, explorer, long-distance hiker on remote ranges, student of nature in her untouched fastnesses, author, an organizer and benefactor of the Wilderness Society, and who, as a Government forester, did distinguished work in the development of the wilderness area systems of the national forests and Indian reservations in this country.

Here is that which the wilderness meant to Bob Marshall as he once described it to a friend --

"It is the song of the hermit thrush at twilight and the lapping of waves against the shoreline and the melody of the wind in the trees. It is the unique odor of balsams and of freshly turned humus and of mist rising from mountain meadows. It is the feel of spruce needles under foot and sunshine on your face and wind blowing through your hair. It is all of these at the same time, blended into a unity that can only be appreciated with leisure and which is ruined by artificiality."\*

We hope that you as a Trailrider will find in this area of primitive mountain country some of those things which so endeared the wilderness to Robert Marshall.



\*The Living Wilderness, July 1941.

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## YOUR NATIONAL FORESTS

The Flathead and Lewis & Clark National Forests through which you will ride are part of the great national forest system represented in 36 of the 48 states and 2 territories. The largest and oldest of these national forests are found in the western states. They were created in most cases from public lands by Presidential Proclamation. Those in the mid-western and eastern states are comprised mostly of land acquired by purchase, exchange, or donation.

### FAR FLUNG AREAS

Our national forests include areas representative of all the country's major forest types, from the great Douglas-fir stands of the Pacific Northwest to the piney woods and hardwood bottoms of the deep South; from the pine and spruce of New England to the chaparral of southern California. There are national forests in Alaska and Puerto Rico.

### VAST RESOURCES

The national forests now contain more than 30 per cent of the nation's total volume of sawtimber. Some 80 million acres of national forest lands are suitable for grazing. National forests are the homes of well over 2 million deer, elk, moose, and other big game animals, about one-third of the nation's big game population. The value of the national forests in protecting watersheds is inestimable. National forest lakes and streams provide sport for the fisherman. Practically all national forest lands are open for recreation -- for sightseeing, camping, picnicking, hiking, and, in snow areas, winter sports.



## HOW ADMINISTERED

The national forests are administered by the Forest Service, a bureau of the U. S. Department of Agriculture. This bureau is headed by the Chief, who has headquarters in Washington, D. C. To facilitate administration, the forests are grouped in regions, each presided over by a Regional Forester. There are ten of these regions. Region One, where you are now, includes all of Montana, that portion of Idaho north of the Salmon River, northeastern Washington, and northwestern South Dakota. In it are sixteen national forests, with a total area approximating that of the States of Vermont, New Hampshire, Connecticut, Massachusetts, Rhode Island, Delaware and New Jersey. The headquarters of Region One are in Missoula.

Each forest has a supervisor with a staff of assistants and technicians. The forest is further subdivided into ranger districts, each under direction of a district ranger. The present day forest ranger is usually a graduate forester, a highly trained specialist in the job of managing the forest lands, and is responsible for seeing that the administrative policies of the Forest Service are carried out. He must be resourceful, able to cope with emergencies such as forest fires, adept at handling men and courteous in dealing with the public. He is a man you will enjoy meeting.

## FOR THE GREATEST GOOD OF THE GREATEST NUMBER

The national forests are dedicated to the proposition that conservation is wise use and adequate protection. In a letter to the Chief Forester, written in 1905 by Secretary of Agriculture James Wilson, is the following clear-cut statement of policy:



"In the administration of the forest reserves it must be clearly borne in mind that all land is to be devoted to its most productive use for the permanent good of the whole people and not for the temporary benefit of individuals or companies. All the resources of forest reserves are for use, and this wise use must be brought about in a thoroughly prompt and business like manner under such restrictions only as will insure the permanence of these resources...."

These have been the guiding principles of national forest administration ever since.

### TWO BASIC PRINCIPLES

In line with the primary objective of the greatest good to the greatest number in the long run, the Forest Service applies two basic principles in the management of national forest resources.

One is the principle of sustained yield. Sustained yield management of timber means that the forest is managed for maximum continuous production of desirable kinds. The techniques of sustained yield management vary greatly with different forest types, but the objective is always the same--continuous renewal of timber crops to replace those harvested. The sustained yield principle applies not only to timber, but also to forage grazed by livestock, to wildlife, and to other renewable resources.

The other basic principle is called multiple use. A given unit of forest land may at the same time produce timber, forage for livestock, and big-game range. Most of the land may be important watershed. There may be choice recreation spots; there may be mineral deposits or water-power sites; there may be outstanding scenic values. Under the

control of someone interested primarily in just one of these uses, the whole area might be set aside for that one use to the exclusion of all others--perhaps for timber production, for grazing, or for recreation. Multiple-use management, however, looks to the coordinated development and use of all the resources and values of the land. A combination of several uses is generally possible on the same area. Conflicts between uses are adjusted under over-all management plans.

National forests are a part of, not apart from, their native states. Twenty-five per cent of the earnings from timber sales, grazing fees, land rentals and water power is returned to the State for distribution to the counties having national forest land and is used to help maintain public schools and roads. An additional ten percent is returned for construction and maintenance of forest roads and trails.

### WILDERNESS AREAS

To preserve for all time representative examples of the American wilderness, the Forest Service has set aside 77 wilderness areas, wild areas, and roadless areas within the national forests. These areas total some 14,000,000 acres--an area nearly as large as Connecticut, New Hampshire and Vermont combined. Commercial timber cutting is not permitted. As most of the areas are in high country with low commercial timber values, however, setting them aside has not actually withdrawn any great amount of usable timber from harvesting. Regulated grazing by livestock may be allowed. The areas will be kept roadless, accessible only by trail or water.

Many are the homes of fine big-game herds and include excellent fishing waters. Among the last remnants of the wilderness in America, they will continue to provide opportunities for the enjoyment of wilderness recreation--for those who yearn for solitude or who want really to rough it.

### THE BOB MARSHALL WILDERNESS

Almost a million acres of superb mountain country lying on both sides of the Continental Divide are included in the Bob Marshall Wilderness. A glance at the map will show the location of this vast domain of primitive country with its many peaks, rivers, and smaller streams, through which stretches the rugged, serpentine backbone of the Continental Divide. East of the Divide lies the Lewis and Clark National Forest, to the west the Flathead. To the east, streams flow to the Atlantic Ocean by way of the Missouri River, to the west to the Pacific through the Flathead River and the great Columbia.

The Bob Marshall Wilderness is especially suited to saddle and pack trips. It has beautiful camping spots with good horse feed. Many streams and lakes afford excellent fishing. Game animals abound. It is the home of the second largest elk herd in the United States. Although precious metals are not found in commercial amounts, rock hounds will find fossils to collect and oil-bearing rocks that can actually be burned.

Scenic mountain peaks are many. An off-shoot of the Continental Divide near Junction Mountain bears the name of the "Flathead Alps" and offers a real challenge to rock climbers. So do parts of the Swan Range. Notable, too is the impressive

escarpment known as the Chinese Wall, where the Divide breaks away to the east in thousand foot sheer cliffs for a distance of 15 miles. Trail Rider parties sometimes climb to the top of the Wall at the only point where it can be scaled.

The South Fork of the Flathead River has recently become quite famous because of the Hungry Horse Dam, recently completed to impound the waters flowing from this great valley. The dam is so far downstream that no part of the Wilderness Area is affected; the artificial lake formed by the dam reaches up the valley to a point about four miles below Spotted Bear Ranger Station.

Many of the lakes seen by Trail Riders through the Bob Marshall Wilderness are of superlative beauty. Big Salmon, the Necklace Lakes on Smokey Creek, the rock-cradled tarns bordered by gardens of alpine flowers near the crest of the Swan Divide, Upper Holland Lake--all these bring joy to lovers of unblemished mountain country.

This is your wilderness, Trail Rider. Enjoy it to the full.

## GEOLOGY OF THE BOB MARSHALL WILDERNESS

By Dr. Charles Deiss\*

The obvious facts that mountains are composed of rocks and that certain types of wildlife are found only in mountainous areas is generally understood. But, conversely, the fact is not widely known that in the dim ages of remote earth history, life contributed much to the actual bulk and modified the composition of the rocks which now comprise the mountains. Likewise, to see great mountains in all their various colors, changing moods, and majestic size is a spiritual and esthetic experience which has inspired beauty and fear in people throughout history. However, only in the past century has a third element been added to the enjoyment of mountains: understanding of the forces which produced them.

### Geologic Time

Measured by that of Mr. Average Man, the life span allotted to Methuselah appears a bit immodest, but the duration of that Hebrew patriarch in turn seems but a brief flicker in the dark when we gaze far back to the dim civilizations of ancient Egypt and Mesopotamia. But when we stand on Larch Hill or other peaks and look out over the ranges within the wilderness area, we are looking at rocks so old that in comparison Methuselah's flicker diminishes to extinction and all human history becomes scarcely discernable. More than 750 million years have passed since the oldest rocks in the wilderness area were deposited.

Geologists divide this time and the rocks of the earth's crust into four great eras based upon the type of life each era was believed to contain.

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From oldest to youngest these are: (1) Proterozoic (called Beltian in western North America), 750 to 540 million years ago, (2) Paleozoic, 540 to 200 million years ago, (3) Mesozoic, 200 to 60 million years ago, and (4) Cenozoic, 60 million years ago to the present. Records of human civilizations do not go back much beyond 10,000 years and are, therefore, insignificant in comparison with this vast span of geologic time.

### Proterozoic Events

During the Proterozoic era that part of western North America now occupied by the Rocky Mountains was a low land on which streams meandered and dumped the loads of sand and mud which they brought from the higher lands to the east. As more sediments were deposited, periodically the area slowly sank beneath the increasing load until it was below sea level and was covered by marine waters which spread from the north over western Montana, British Columbia, and eastern Idaho. Within these seas, plants and soft-bodied minute animals lived, and lime oozes, sands and muds accumulated.

In the vicinity of Missoula in central western Montana sediments 60,000 feet in thickness were laid down, of which 20,000 to 25,000 feet are exposed in the wilderness area. Because the sea bottom sank at the same rate at which the sediments were deposited the seas remained shallow as is evidenced by abundant ripple marks, sun cracks, and rain imprints throughout the entire thickness of these rocks. As the pressure increased from the weight of the overlying sediments, the sands, muds, and limy oozes were slowly compressed and hardened into rocks: sandstones, shales, and



limestones. These rocks today are called the Beltian series from the Belt Mountains in central Montana.

The Beltian rocks within the wilderness area total between 20,000 and 25,000 feet in thickness, and from oldest to youngest are named: Helena limestone, approximately 5,000 feet thick, blue-gray impure limestone; Miller Peak argillite, 3,000 feet, red, maroon, or lavender, fine-grained shaly beds; "Lake limestone," 1,000 to 1,500 feet, buff or straw-colored thick-bedded calcareous iron-stone; and "Evans quartzite," 10,000 to 16,000 feet, red and maroon to pink, sandy and occasionally shaly quartzite and argillite. These rocks form the bulk of the Swan Range, and are well exposed on Montour, Goat, and Cardinal Mountains, and at Pyramid, Montour, and Danaher Passes. They also form a wide belt extending from Brownstone Peak northeast to Big Prairie Ranger Station, and northward beyond the Spotted Bear River. Another similar belt of these ancient Proterozoic rocks extends from Twin Peaks, which lie just east of Camp Creek Pass on the Continental Divide, northward below the Chinese Wall and on beyond the Spotted Bear River. Within this belt are Red Buttes between the Chinese Wall and the West Fork of the Sun River, and Larch Hill just east of the north end of the Chinese Wall forming the divide between the Spotted Bear and the West Fork of Sun River.

Throughout the vast time (probably more than 200,000,000 years) that the Beltian sediments were accumulating in western North America, Mother Earth had lain quietly, apparently sleeping. Not long after the "Evans quartzite" was deposited, she awakened, with a violent start in the Grand Canyon region of Arizona, but more quietly in Montana. As a result

of this awakening movement the western part of America was elevated, and within the wilderness area the Beltian rocks were gently tilted and elevated at least 11,000 feet into a broad dome-like mass. Erosion immediately began cutting down the elevated rocks, and continued to do so for millions of years until the area was again reduced to a plain which lay close to sea level. Thus the line of contact of the basal Paleozoic sandstone upon the underlying "Evans quartzite" represents thousands of feet of erosion, and millions of years. Yet, of the hundreds of people who have looked at these rocks, less than a dozen have ever known the tremendous changes in the face of the earth recorded there.

### Paleozoic Events

The Paleozoic rocks within the wilderness rest upon the Beltian red quartzites and argillites, and consist of a great series of limestones approximately 4,000 feet thick, which form most of the white and buff-gray cliffs in the Swan, Flathead, and Lewis & Clark Ranges. These rocks were deposited in a series of inland seas which extended northward into the Arctic and southward through southern California into the Pacific Ocean. In contrast with the Beltian seas those of the Paleozoic were swarming with life: invertebrates of various kinds (sponges, corals, brachiopods and trilobites) during the early part of the era, and also sharks and lung fish in the latter part. Corals were abundant in the Middle and later Paleozoic seas, occasionally building reefs. Brachiopods are bivalved animals whose shells resemble an extremely symmetrical clam shell. They are still present in the oceans but vastly greater numbers lived during the Paleozoic era. The trilobites were animals whose bodies were divided

longitudinally into three lobes, and belonged to the class Crustacea of which the crabs and lobsters are living representatives. Trilobites were numerous within the lower Paleozoic seas of the Cambrian period in the Rocky Mountain region. The invertebrates which made their shells of lime (calcite) also lived in such profusion that the accumulation of their shells on the sea bottoms formed a large part of the deposits later hardened into limestones which now form the mountains. The remains of these invertebrate animals now preserved as fossils in the rocks of the wilderness area are the evidence which tells us that these rocks are of Paleozoic age, and are 540 to 200 millions of years old. Within the wilderness area, the Paleozoic rocks belong to three systems: Cambrian, Devonian, and Mississippian.

### Cambrian

The lower rocks of Cambrian age are cross-bedded coarse grained sandstones which contain pebbles of pure glassy quartz 1/16 to 1/2 inch in diameter. Above the sandstone is approximately 200 feet of green and brown-maroon micaceous shale which is rarely well exposed except on the higher ridges, and is usually covered with grass and soil. The grassy flat or bench just beneath the limestone cliffs of the Chinese Wall is formed of this shale. Above the shale and forming most of the Cambrian in the area is a series of limestones 1,000 to 1,700 feet in thickness, containing occasional intercalated shaly zones in the middle part. Some of the most spectacular cliffs and peaks in the wilderness area, such as those on Scapegoat, Gordon, Bullet Nose, and Kid Mountains are composed of these limestones.

The rugged and spectacular limestone area between the South Fork of the Flathead on the west, the West Fork of Sun River on the east, the Spotted Bear River on the north, and Danaher Creek on the south is called by geologists the Silvertip Syncline (a downfold) or the White River Basin because Silver Tip Mountain and White River lie in the central part of this mass of limestone. Within the region most of the imposing cliffs are formed entirely of Cambrian rocks. Perhaps the most sublime and widely known of these features is the Chinese Wall and its continuations southward nearly to Camp Creek Pass, and northward beyond Larch Hill on the west side of Wall Creek. Haystack, Cliff and Salt Mountains upon the Chinese Wall are likewise composed entirely of Cambrian limestones, as are also the line of lofty cliffs extending from Rock Creek northward more than 12 miles and forming part of the Continental Divide.

After the Cambrian limestones were deposited the marine waters drained from the area as the sea bottom rose and became land. This limy land surface remained flat and lay just above sea level for many millions of years until the beginning of the Devonian period of earth history in the middle part of the Paleozoic area.

### Devonian

Toward the middle of the Devonian period the region of the Rocky Mountains sank and was again covered by waters from the Pacific Ocean. Animals and sea weeds were abundant, and limy oozes and muds were deposited within the newly formed sea. These muds, later hardened and compressed into the rocks which now rest upon the Cambrian formations in the wilderness area, are nearly 1,000 feet in thickness, and

consist of buff-gray and brown petroliferous limestones which are fetid when struck with a hammer. The rotten-egg odor is produced by hydrocarbons which represent the chemically altered remains of the bodies of the plants and animals which lived in the old Devonian sea and now disseminated in the rock. Hydrocarbons are more concentrated in the upper brown beds than in the lower pale-gray limestones. Near the base these rocks are red shales which can be seen in cliff faces near the top of Gordon, Bullet Nose and Slategoat Mountains. The Devonian rocks in Montana are called the Jefferson limestones from their typical exposure on the Jefferson River southwest of Three Forks, Montana.

The Jefferson limestones are often rich in fossils, especially coral skeletons, brachiopod shells, and primitive fish teeth. Primitive plants (Algae) known as Stromatopora are numerous and contributed much lime to the bulk of the limestones when they were deposited in the Devonian seas. The richest Devonian fossil locality within the wilderness area is on Pilot Peak, 2 miles northeast of Gordon Mountain in the Swan Range. Devonian fossils are also common on Slategoat Mountain east of the Chinese Wall and on Lone Butte in the north central part of the White River Basin.

Toward the close of Devonian time the area was again raised above sea level for a relatively short time, only to sink again and be reflooded by oceanic waters in the next geologic period.

### Mississippian

When the ocean flooded the area during the latter part of the Paleozoic era, it brought with it a great population of corals, brachiopods, and especially crinoids (animals which in the present ocean



are called "sea-lilies"). Sharks whose bodies were covered with spines were also numerous. The invertebrates lived in such prodigious numbers that their shells actually comprise more than half the bulk of the rocks formed at that time. Consequently, the rocks of this period, Mississippian, in the wilderness area are nearly pure limestones. These are the youngest Paleozoic limestones in the area, and are called the Madison limestone, named from the Madison River in southwestern Montana.

The fossil remains of these Mississippian animals can be found in the limestone on the main Danaher Creek trail opposite the mouth of Foolhen Creek. At this locality several shark spines and numerous corals and brachiopods have been collected.

The Madison limestone usually weathers white-gray, and rests upon the darker brown Jefferson limestone, and can be readily recognized by the relatively large amounts of dark and white chert (flint) which occurs as nodules or irregular beds between the limestones. In addition to the other fossils preserved in these rocks, lace-like bryozoans (moss animals) are numerous. Madison limestone forms the north end and top of Slategoat Mountain, the top of Silver Tip Mountain, most of Sentinel Mountain, and many of the peaks in the Sawtooth Range east of the North Fork of Sun River.

At the end of Mississippian time this part of Montana was raised above sea level and remained at low-lying land mass for many millions of years until it again, and for the last time, was flooded by marine waters during the middle and later part of the Mesozoic era. Mesozoic rocks are present in the valleys of the North and South Forks of Sun



River, and undoubtedly must have covered the entire wilderness area at one time. However, erosion has removed them, and today not a trace remains.

### The First Rocky Mountains

At the end of the Mesozoic era (approximately 60 million years ago) that part of western North America which had been intermittently under sea water throughout the Proterozoic, Paleozoic, and Mesozoic eras (nearly 700 millions of years) was subjected to tremendous stresses from within the earth, and all the sediments deposited there began to be folded, broken by great faults, and elevated into a cordillera (system of mountain ranges) extending from Alaska on the north into Mexico on the south. This mountain-making movement continued into the early part of the Cenozoic era when the great faults developed which allowed the Swan, Flat-head, and Lewis & Clark Ranges to move beyond their present heights. The most widely known and one of the grandest of these faults in the world is the Lewis overthrust which has been traced and mapped from Canada, southward through Glacier Park and on throughout the length of the Sun River Unit where it lies several miles west of the North Fork of Sun River. Along the surface of this stupendous break in the earth's crust the ancient Beltian rocks were shoved up over the younger Mesozoic rocks and moved eastward as much as 12 miles in the Glacier Park region, and probably 9 or 10 miles in the wilderness area.

Thus we see Mother Earth awaken once more from a long sleep, bestir herself violently this time, and give birth to the first or original Rocky Mountains. The first Rockies were probably rounded hills whose summits were flat. The intermontane valleys were broad, and stood higher above sea level than those

of today. Cliffs must have been rare, being developed only on the great surfaces of weakness along which the rocks had broken and slipped.

Throughout the first half of the Cenozoic era (60 to 30 millions of years ago) rain fell and all factors of weathering and erosion were active, except ice. Erosion continued to gnaw away the mountains, by cutting the valleys deeper and longer, and eventually lowering the divides between the streams. The eroded material (sands, muds, and lime in solution) was transported from the mountains by streams and dumped upon the plains growing to the east. By the latter part of the era, possibly 10 millions of years ago, the first Rockies were maturely eroded and reduced in height. Likewise, the streams had cut many valleys and established much of their present drainage pattern.

Sometime between 10 and 5 millions of years ago, Mother Earth bestirred herself for the last time, and re-elevated the Rocky Mountains. Although these mountain-forming movements were essentially finished two millions of years ago at the beginning of the Pleistocene (glacial) period, slight adjustment of the rocks to the tremendous pressures which elevated them against the force of gravity are still taking place, as is evidenced by the recent earthquakes in the vicinity of Helena.

### The Pleistocene Period (Glacial)

Throughout most of geologic time the climate of the wilderness area seems to have been mild temperate to subtropical; even seasonal changes not being clearly indicated. At the end of the Cenozoic era, and partly as a result of the elevation

of mountains in various parts of the earth, a profound change took place in that the climates became frigid. Instead of rain, snow fell. As it did not all melt, great depths soon accumulated on the ridges and finally in the valleys. As more and more snow fell, the underlying mass was changed into granular snow and finally ice by the pressure of the constantly increasing load above. Once this ice began to move it became a series of mountain (Alpine) glaciers and the Pleistocene or glacial period was a reality.

The glaciers in the wilderness area formed at least two different times: First early in the Pleistocene, possibly two million years ago; and second, late in the period between 50,000 and 30,000 years ago. The second glaciers remained until 20,000 to 12,000 years ago before they melted from the lower valleys. The present glaciers in Glacier Park, the Canadian Rockies and elsewhere, are the dying remnants of what were once vast ice sheets which nearly buried the mountains.

Ice, in the form of glaciers, during the Pleistocene produced the present scenery of the mountains. By constant freezing and thawing, combined with the bodily movement of the mass of the glaciers downward away from the peaks, the ice cut headward into the peaks, tore out great masses of bedrock and sculptured the sheer cliffs which occur throughout the wilderness area. The magnificent amphitheatres or "Cirques" on the sides of the peaks were similarly carved out of solid rock. Thus, the ruggedness and scenic grandeur of such mountains as Kid, Gordon, Bullet Nose and Scarface in the Swan Range, Pagoda, Lone Butte and Silver Tip in the Flathead Range, and Prairie Reef, Slategoat and Pentagon in the Lewis & Clark Range are largely the result of ice action during the last part of the Pleistocene.

Probably the most spectacular and widely known result of the ice action is the line of sheer cliffs known as the "Chinese Wall" which forms the Continental Divide from Larch Hill southward to Haystack Mountain.

Below the higher peaks many of the valleys were cut into U-shaped troughs by the glaciers which filed or rasped their way downward through the solid rock as they flowed out toward lower elevations. White River Valley just below the junction of the north and south forks is typically glacial cut and U-shaped. The rock debris torn and cut from the peaks and higher mountain valleys was frozen into the ice and carried to the lower valleys and out in front of the ranges where it was dumped as the glaciers melted. In this manner the pulverized rock, large and small boulders, and other debris were left as moraines in the larger valleys and in front of the ranges to form such knob and basin topography as that in the broad area of Kleinschmidt Flats around Ovando.

Since the ice melted back from the lower valleys, possibly 12,000 years ago, the streams have again started to cut downward and intrench themselves in the small but sheer-walled canyons in the glaciated (flattened) valley floors.

Thus, the Rocky Mountains today, and particularly those in the wilderness area, were elevated from an old sea bottom, and were built of sedimentary rocks composed of sands, muds, shells of animals, and limy deposits of plants. Rain water and streams eroded the rocks during the millions of years of the Cenozoic era, and finally within the past 50,000 years ice sculptured the mountains and produced their present ruggedness and scenic beauty.

In summary: When we look at the unspoiled mountains in the wilderness area we not only see the beauty of line and color, feel the emotions of inspiration, fear, and grandeur, but also understand the forces and events in the history of the earth which were literally powerful enough to produce mountains.



## FAUNA AND FLORA OF THE AREA

By K. D. Swan\*

### Animals

Moose, elk, mule deer, whitetail deer, grizzly bear, black bear, mountain sheep, mountain goats are found in the Bob Marshall Wilderness. A traveler will see many, if not all, of these species if he watches for them.

Shira's moose is the species common to the locality. Animals are sometimes seen in the basins at high elevations or along lake shores where the land is swampy.

Elk, which are very plentiful, are usually found in summer at the higher elevations where there is feed. In winter they are forced by deep snows to the lower elevations and tend to concentrate on areas where they can find forage. Very often this forage is not sufficient to maintain them in good condition and a stark battle for life begins. The adjustment of these herds of elk to available winter range is one of the difficult game management problems in wilderness and other areas because of the borderline encroachment of civilization.

The Rocky Mountain mule deer, so named because of its large, mule-like ears, is common everywhere. This species is sometimes incorrectly called blacktail because of a small black tip on the tail. However, the true blacktail is a Pacific Coast species not found in this section. The whitetail is a smaller deer and much more shy in its habits. Its white flag-like tail is conspicuous as it runs through the woods or brush.

\*Retiree



A few grizzly bears roam the mountains, mostly at or near timber line in summer. This lordly animal is one of the most interesting creatures of the wilderness and the sight of one is sure to bring a thrill. They are sometimes seen in the high country turning over rocks for lady bugs or ants which they relish. The grizzly is harmless if not molested but a fierce antagonist if cornered.

Black and brown bears are much more common. Although differing in color, black and brown bears belong to the same species - the black might be called a brunette, the brown a blond. These bears are sometimes a nuisance around places of human habitation where they like to prowl for food, but are harmless if not molested. Don't try to corner a mother bear with cubs !

Mountain sheep are not common, but a few live in the craggy country extending from Rock Reef east to the North Fork of the Sun River as far as the forks. Mountain goats are much more numerous than sheep and will be seen in high country, notably at the Chinese Wall where they climb to positions on the cliffs which defy human approach.

Some of the smaller animals are fully as interesting as the larger game animals. Coyote, badger, beaver, muskrat, porcupine, whistling and hoary marmots, woodchucks, coneys, squirrels of several varieties, chipmunks, snowshoe and cottontail rabbits are common, and any observant person will be sure to see many or all of them. There are a few cougar, sometimes called mountain lions, but they are seldom seen by the traveler. The little fur bearers - the martin, mink, weasel - are sometimes but not often glimpsed.

The golden-mantled ground squirrel, which resembles somewhat the chipmunk, is a likeable little fellow who may often be seen playing around lookout cabins. The boys stationed at these lonely points often make pets of these squirrels.

### Fish

The streams and lakes of wilderness areas are usually much less fished than waters nearer civilization, consequently furnish better sport to those who care to try their luck. Native cut-throat and rainbow trout are commonly found in all the streams. The char, or Dolly Varden trout sometimes reaches great size in the larger streams and lakes. Eastern brook trout have been planted in certain streams. In September thousands of Rocky Mountain white fish migrate up the South Fork and its larger tributaries where they furnish good sport. Sometimes the fisherman hooks a chunky sucker-like fish with a small mouth. This is the Columbia River chub which is said to be fair eating although rather bony.

Those who know say the wet fly is most successful in the South Fork country, and advise the old standbys - the Royal Coachman and the Grey Hackle. Fancy tackle, they say, is unnecessary. When the fish will not rise to a fly many fishermen resort to grasshoppers or wood worms.

## Birds

Knowing the names and something of the habits of the birds one sees adds greatly to the enjoyment of a trip into the wilderness. One does not need to be a trained ornithologist to learn to identify the more common species met with along the trail. Some riders will want to slip a good bird book in their duffle - Roger Tory Peterson's "A Field Guide to Western Birds" is applicable to this locality and is small enough to be carried easily. A pair of binoculars is a big help in picking out characteristics of species seen. And in almost every party there is someone well enough acquainted with the birds of the region to be able to help the beginner identify them.

By mid-July there is a noticeable diminution of bird songs heard earlier in the season, but those alert to the notes of the forest will still have ample opportunity to renew old acquaintances in the bird world or make new ones. Easterners will recognize their old friend the red-eyed vireo, or preacher bird, who repeats his monotonous song interminably from the tree tops during the hottest summer days. The olive-sided flycatcher, a western species, will call "quick, three beer" from the top of some burned snag. Toward night at the higher elevations the Audubon hermit thrush will sound its bell-like notes.

On the bank of a swift-flowing stream one may notice a gray bird, a little smaller than a robin, teetering on a rock at the water's edge. Suddenly he dives completely out of sight into the current, to reappear in a few seconds at some distance from

the point where he entered the water. This is the water ouzel, or dipper, whose underwater feeding habits make it one of the most remarkable birds in the West.

In the dark spruce woods a fluent song, sweet but penetrating, will sometimes be heard rippling out on the quietness of the forest. This is the winter wren, more easily heard than seen. This elusive little creature will lead one a fine chase through menziesia thickets and among mossy logs in its efforts to escape detection.

Among the woodpeckers the northern pileated attracts attention by a loud staccato hammering which carries above other forest noises and leads one to discover this handsome bird with the black body and the large red crest, drumming away on a tree or snag.

Three jays other than the magpie are sure to be seen. The Rocky Mountain jay, or camp robber, will often be found slinking about camp waiting to swoop down from a nearby limb to snatch bits of food left within reach. His relative, the black-headed jay often comes about camp, too. Dark blue, with a handsome crest, he is one of the most conspicuous birds of the pine forests. The Clarke nutcracker announces himself by a loud "krrrrr" as he flies over the tree tops or recovers seeds from cones among the pine branches.

Those who have not heard the call of the loon from some secluded mountain lake have missed one of the rare thrills of the wilderness. This big diver with the pointed bill is often seen on Big Salmon Lake, where there are said to be one or more nesting pairs.

These are only a few of the bird adventures which may be experienced by those who go into the Bob

Marshall Wilderness. There will be many more - some to be jotted down in notebooks, but by far the greater number to be carried away in memory to enrich the recollections of the trip.

The following hypothetical list of birds which may possibly be seen along the route followed by the Trail Riders has been compiled from the following: Bird List of Carol Wells, 1934 Trail Rider.

"List of Birds of Western Montana," by Winton Weydemeyer, K. D. Swan and E. F. Rapraeger. Published by the U. S. Forest Service, Missoula, Montana, 1940. "The Birds of Glacier National Park," by Florence Merriam Bailey, published by the National Park Service, 1918.

Common name

Lesser Loon	Holboell's Grebe
Western Grebe	Common Mallard
Green-winged Teal	American Golden-eye
American Merganser	Sharp-shinned Hawk
Western Red-tailed Hawk	Osprey
Eastern Sparrow Hawk	Richardson's Grouse
Franklin's Grouse	Gray-ruffed Grouse
American Coot	Killdeer
Spotted Sandpiper	Northwestern Horned Owl
Pacific Nighthawk	Rufous Hummingbird
Calliope Hummingbird	Western Belted Kingfisher
Red-shafted Flicker	Western Pileated Woodpecker
Lewis's Woodpecker	Hairy Woodpecker
Batchelder's Woodpecker	Arctic Three-toed Woodpecker
Alder Flycatcher	Western Wood Peewee
Olive-sided Flycatcher	Violet-green Swallow
Tree Swallow	Rocky Mountain Jay
Black-headed Jay	American Magpie



American Raven  
Clarke's Nutcracker  
Mountain Chickadee  
Red-breasted Nuthatch  
Dipper  
Western Winter Wren  
Western Robin  
Audubon's Hermit Thrush  
Willow Thrush  
Townsend's Solitaire

Eastern Ruby-Crowned  
Kinglet  
Cassin's Vireo  
Western Warbling Vireo  
Eastern Yellow Warbler  
Townsend's Warbler  
Macgillivray's Warbler  
Northern Pileolated

Warbler  
Western Meadowlark  
Brewer's Blackbird  
Rocky Mountain  
Grosbeak  
Western Evening  
Grosbeak  
Northern Pine Siskin  
Bendire's Crossbill  
Western Vesper Sparrow  
Western Chipping  
Sparrow  
Slate-colored Fox  
Sparrow

Western Crow  
Long-tailed Chickadee  
Rocky Mountain Nuthatch  
Rocky Mountain Creeper  
Western House Wren  
Catbird  
Northern Varied Thrush  
Olive-backed Thrush  
Mountain Bluebird  
Western Golden-Crowned  
Kinglet

American Pipit  
Red-eyed Vireo  
Orange-crowned Warbler  
Audubon's Warbler  
Grinnell's Water Thrush  
Western Yellow-throat

American Redstart  
Giant Red-wing  
Western Tanager

Lazuli Bunting

Cassin's Purple Finch  
Pale Goldfinch  
Arctic Towhee  
Red-backed Juncos

Gambel's Sparrow

Merrill's Song Sparrow



## Flowers

The superb display of blossoms in woods, parks, and timber-line meadows challenges the interest of all who ride the trails of the Bob Marshall Wilderness during the summer months. Visitors from the east will make friends with many new species; those from western states will find many with which they are already familiar. But whether from the east or west, all travelers will carry away delightful memories of a pagent of blossoms, and some a more tangible record on color film.

Perhaps the showiest of the blue flowers is the lupine. Although past its prime in the lower country by July, many blooms are seen later at higher elevations in the mountains, and under the shade of forest trees. Also common are species of pentstemon, or beard tongue, usually found on comparatively dry sites. Other blue flowers are maturing in midsummer in the moister spots - tall mertensia, monkshood, forget-me-not, speedwell.

Yellow blossoms are many. The Oregon grape, state flower of Oregon, a relative of the eastern barberry, has clusters of pale yellow blossoms which later develop into bluish berries. The heart-leaf arnica is found in the shadiest spots until late summer. And everywhere are the golden senecios, members of the largest genus of flowering plants.

Crimson blossoms of Indian paintbrush are as vivid as anything among flowers. But all the blooms of this plant are not particularly eye-compelling; the shades vary from modest creams, through orange, to the rich vibrant red. Although

the paintbrush is a member of the snap dragon family, it is not often recognized as such by the layman. However, the pink monkey flower, usually found growing beside streams or in well-watered alpine meadows, has the well-known characteristics of a snap dragon. A clump of these delicate blossoms vibrating in the spray from a mountain torrent is a sight long to remember.

It is interesting to notice how plants seek the environment most suited to their development. Look in the wet meadows, perhaps in the vicinity of an old beaver dam, for the unique elephant flower, or the white bog orchis, whose small blossoms are unbelievably sweet-scented. Follow the dry, gravely ridges for the sulphur plant, the pearly everlasting, or the showy pentstemon. Perhaps on mountain tops exposed to the full glare of summer sun, you will find close-growing clumps of the alpine forget-me-not (*Erytrichium*), or the carpet pink (*Silene acaulis*).

Among the plants familiar to eastern as well as western visitors are the fireweed, the twin flower, and the dwarf dogwood. The first, which derives its name from its habit of coming in on country recently burned over, encircles the globe in the northern hemisphere. Its bluish pink flowers are found almost everywhere along the trail. The paired blossoms of the twin flower, a member of the honeysuckle family, is also a world traveler throughout the northern woods. Its Latin generic name, *Linnaea*, honors the famous scientist, Linnaeus. The dwarf dogwood, whose white blossoms develop into crimson berries by late summer, and known to easterners as the bunchberry, will be found rather widely distributed in the deep woods.

Lucky are those visitors who come to this country during the blooming period of the beargrass, which affords one of the greatest flower shows of the Northwest mountain country. The plant is not a grass, but belongs to the lily family. The flower stalks, at the top of which the creamy white blossoms are clustered in a dense spike, grow to a height of 3 or 4, or even 6 feet. The tough, wiry leaves have been used by the Indians for baskets, from which the plant is sometimes called squaw grass. The conspicuous blooms often form a sea of white in favored years in the meadows on the eastern side of the Chinese Wall, or at other places where like conditions prevail.

To describe all the flowers, or to give means of identifying them is not the intention of this sketch. However, below is given a list of some of the commonest herbaceous plants found in the Bob Marshall Wilderness. See how many you can find.

#### Common name

Beargrass	Bog asphodel
Bronze bells	False bellehore
Death camas	Glacier lily
Purple onion	Blue camas
Queencup	False Solomon's seal
Star Solomon's seal	Fairy bells
Twisted stalk	Trillium
White bog orchis	Green bog orchis
Ladies tresses	Twayblade
Rattlesnake plantain	Coralroot
Mountain sorrel	Bistort
Silver Plant	Sulphur plant
Umbrella plant	Spring beauty
Carpet pink	White catchfly
Bladder campion	Chickweed

Mouse-ear chickweed	Sandwort
Anemone	Pasque flower
Meadow rue	Purple clematis
White clematis	Buttercup
Baneberry	Yellow columbine
Larkspur	Globeflower
Oregon grape	Wild candy tuft
Whitflow grass	Rock cress
Yellow stone crop	Red stone crop
Fringed parnassia	Miterwort
Alum root	Lace flower
Cliff saxifrage	<b>Saxifrage</b>
Ninebark	Pink meadow sweet
White meadow sweet	Cinque foil
Strawberry	White dryad
Yellow dryad	Yellow avens
Purple avens	Thimbleberry
Mountain Spray	Wild rose
Service berry	Lupine
Milk vetch	Loco
Yellow hedysarum	Pink hedysarum
Vetch	Purple geranium
White geranium	Blue flax
Wild hollyhock	St. John's-wort
Violet - several species -	
white, blue, yellow	Fireweed
Alpine fireweed	Cottonweed
Wild sarsaparilla	Cow parsnip
White angelica	Yellow angelica
Bunchberry	Pipsissewa
Pyrola	Wood nymph
Indian pipe	Pine sap
Pine drops	Creeping wintergreen
Kinnikinnick	Shooting star
Blue gentian	Small gentian
Smooth dogbane	Hairy dogbane
Jacob's-ladder	Skunk plant
Phacelia	Mist maiden
Stick seed	Forget-me-not

Mint  
Pentstemon  
Pink monkey flower  
Indian paintbrush  
Elephant-head  
Northern bedstraw  
Twinflower  
Harebell  
False dandelion  
Hawkweed

Goldenrod  
Fleabane  
Pathfinder  
Balsam root  
Yarrow  
Arnica  
White thistle

Horsemint  
Yellow monkey flower  
Speedwell  
Indian warrior  
Alpine lousewort  
Sweet bedstraw  
Valerian  
Alpine dandelion  
Rattlesnake root  
Hieracium (several  
species)  
Aster  
Pussy toes  
Pearly everlasting  
Gaillardia  
Sweet coltsfoot  
Senecio (Ragwort)



## Common Trees

### Western white pine - Pinus monticola

A few specimens may possibly be seen along the South Fork of the Flathead and its tributaries. Has a slender, slightly tapering trunk which may reach a height of 125 feet or more. Bark, greyish purple, broken into square blocks. Crown, narrow, more or less conical. Needles, 2 to 4 inches long in clusters of 5, flexible, bluish green. Cones, slender, 6 to 10 inches long, occurring principally near the tops of the trees. The species grows plentifully farther west in northern Idaho and eastern Washington and is the most valuable lumber tree of that locality.

### Whitebark pine - Pinus albicaulis

One of the most common trees near timber line, where it is often only a shrub. Conspicuous because of its white bark. Rarely more than 25 feet high. Stout needles,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long in clusters of 5, dark yellow green. Cones,  $1\frac{1}{2}$  to 3 inches long, brown or purple with thick heavy scales which open only slightly upon ripening. This is one of the picturesque trees of timber line where twisted and stunted specimens indicate a battle with snow and wind.

### Ponderosa pine - Pinus ponderosa

A large tree with a tall, heavy trunk covered with reddish plates. Easily recognized by the long needles, 3 to 10 inches, in bundles of 3. In the younger trees the bark is blackish instead of reddish. Cones, large, 2 to 4 inches long, pineapple-shaped. The most widely distributed cone-bearing tree of the west, ranging from Canada to Mexico, and from the Pacific Coast to the Black Hills. Very important for lumber. Extensive stands rarely found at ele-

variations over 5,000 feet. Fine specimens will be seen in the Blackfoot Valley, along the South Fork of the Flathead River, and in the Swan and Clearwater Valleys.

Lodgepole pine - *Pinus contorta*

A common species. Typically a medium-sized tree, with straight, tapering trunk and small crown, although when growing in the open sometimes assumes a more spreading habit. Scaly bark, greyish brown or blackish. Short needles, 2 to 3 inches, in bundles of 2, yellow green. Cones 1 to 1½ inches long, spiny, usually remaining unopened on the tree for a long time. One of the first species to come up on burned areas. Much in demand at present for poles, mine timbers and pulp. Where obtainable, young trees were used by Indians for lodge or tepee poles, hence the name.

Western larch - *Larix occidentalis*

Often over 100 feet high with a clean, slightly tapering trunk and a short, narrow, pointed top. Bark cinnamon brown, furrowed near base of trunk, smoother above. Leaves, needle-like, short, tufted on the branchlets instead of in bundles like the pines. Needles turn yellow in autumn and fall off, leaving branches bare during the winter. Cones, 1 to 1½ inches long, oblong, with numerous thin, stiff scales. Wood, heavy, strong, easily split. Used extensively for lumber. The finest specimens will be seen in the Blackfoot Valley, along the South Fork and in the Swan and Clearwater Valleys.

Engelmann spruce - *Picea engelmanni*

Large tree with a slightly tapering trunk and a pyramidal crown. Bark, purplish brown, composed of small, loose scales. Foliage bluish or dark green, the needles stiff, four-sided, sharp-pointed.

Cones, 2 inches long, oblong, in great numbers on upper branches, maturing in single season. Common in cool canyons, along streams and lakesides. Will be found frequently along the route.

Douglas-fir - Pseudotsuga Menziesii, Var., Menziesii (SPN).

A very common forest tree of the region, found growing in many situations. Near timber line it is low and stunted; in favored localities at lower elevations, it becomes a large forest tree. Trunk of mature specimens, tall and heavy, with dark, deeply furrowed bark. Crown pyramidal, with lower branches drooping and with slender, often very long, pendent side branches. Young trees of this species are cut extensively for Christmas trees and shipped to midwestern and eastern markets. Cones distinctive and the easiest means of identifying the tree, 2 to 3 inches long with a 3-pronged bract protruding beneath each scale. Terminal buds on each branchlet are slender and sharp-pointed. This is the "red fir" of the Pacific Coast, most important lumber species of that region.

Alpine fir - Abies lasiocarpa

Common near timber line and frequent also at much lower elevations. Near timber line it is a small tree or a spreading shrub. At lower elevations, it develops into a large tree with a long, narrow pointed crown. Foliage not prickly like spruce, - aromatic. Bark, smooth, grey, with blisters which exude balsam when pricked. Cones,  $2\frac{1}{4}$  to 4 inches long, purplish, black, erect on branches near top of tree, scales falling from central axis in autumn. Widely scattered along route. This tree will remind some of the Canada balsam. Good for a bough bed.

Rocky Mountain juniper - Juniperus scopulorum

Scattered specimens will be seen in dry situations, mostly at lower elevations, along the route. A tree from 15 to 20 feet high with a trunk 16 inches or less in diameter and a rather narrow rounded crown of large long limbs which trend upward. Bark, light cinnamon brown, stringy, distinctly cut by wide shallow furrows. Foliage, pale ashy green in color. Needles, scale-like, on mature branches; needle-like on young branches. Fruit, berry-like, blue in color, covered with a waxy bloom.

Aspen - Populus tremuloides

A small, slender broad-leaved tree which usually grows in rich soils near water courses. May reach a height of 80 feet. Bark, greenish grey, darker and deeply furrowed near base of trunk. Widely distributed in the northwest. Leaves flutter in the slightest breeze. Sometimes called Quaking Asp.

Water birch - Betula fontinalis

A graceful shrub or small tree found along streams and on other moist sites. Leaves 1 to 2 inches long by  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches wide, broadly egg-shaped, with toothed margins. Bark, dark grey or brown, often lustrous copper color on younger branches.

Paper birch - Betula papyrifera

The paper or canoe birch with its white peelable bark is too familiar to need a description. It will be noticed occasionally west of the Continental Divide.

Mountain maple - Acer glabrum

A small tree or shrub, common at lower or middle elevations, easily recognized by its resemblance

to other maples. Bark of the older stems, grey, of branchlets and twigs, red.

Thinleaf alder - *Alnus tenuifolia*

Small tree or large shrub with smooth, brown trunk. Leaves, 2 to 4 inches long, broadly egg-shaped, shallowly lobed. One of the most abundant shrubs along streams and in other moist spots. To many persons, alders look very much like birches, but the fruit cones of the birch fall apart very easily, whereas those of the alder do not disintegrate even at maturity. This species grows at lower elevations than the green alder (*Alnus sinuata*) a shrub which extends up to timber line, often forming almost impenetrable thickets with stems bent close to the ground.

Common Shrubs

Western Yew	Common Juniper
Willow, several kinds	Sticky currant
Spiny currant	Goatsbeard
Shrubby cinquefoil	Wild rose, several species
Thimbleberry	Red raspberry
Service berry	Mountain ash
Hawthorn	Western chokecherry
Mountain lover	Buckthorn
Snow brush	Canadian buffalo berry
Devil's-club	Red osier dogwood
Labrador tea	Menziesia
Red heather	Huckleberry, several species
Snow berry	Black twinberry
Red twinberry	Elderberry



## REGULATIONS OF THE SECRETARY OF AGRICULTURE

### Wilderness Areas

Reg. U-1. Upon recommendation of the Chief, Forest Service, national forest lands in single tracts of not less than 100,000 acres may be designated by the Secretary as "wilderness areas," within which there shall be no roads or other provision for motorized transportation, no commercial timber cutting, and no occupancy under special use permit for hotels, stores, resorts, summer homes, organization camps, hunting and fishing lodges, or similar uses; provided, however, that where roads are necessary for ingress or egress to private property these may be allowed under appropriate conditions determined by the forest supervisor, and the boundary of the wilderness area shall thereupon be modified to exclude the portion affected by the road.

Grazing of domestic livestock, development of water storage projects which do not involve road construction, and improvements necessary for fire protection may be permitted subject to such restrictions as the Chief deems desirable. Within such designated wildernesses, the landing of airplanes on national forest land or water and the use of motor boats on national forest waters are prohibited, except where such use has already become well established or for administrative needs and emergencies.

Wilderness areas will not be modified or eliminated except by order of the Secretary. Notice of every proposed establishment, modification, or elimination will be published or publicly posted by the Forest Service for a period of at least 90 days prior to the approval of the contemplated order and if there is any demand for a public hearing, the regional

forester shall hold such hearing and make full report thereon to the Chief of the Forest Service, who will submit it with his recommendations to the Secretary.

### Wild Areas

Reg. U-2. Suitable areas of national forest land in single tracts of less than 100,000 acres but not less than 5,000 acres may be designated by the Chief, Forest Service, as "wild areas," which shall be administered in the same manner as wilderness areas, with the same restrictions upon their use. The procedure for establishment, modification, or elimination of wild areas shall be as for wilderness areas, except that final action in each case will be by the Chief.





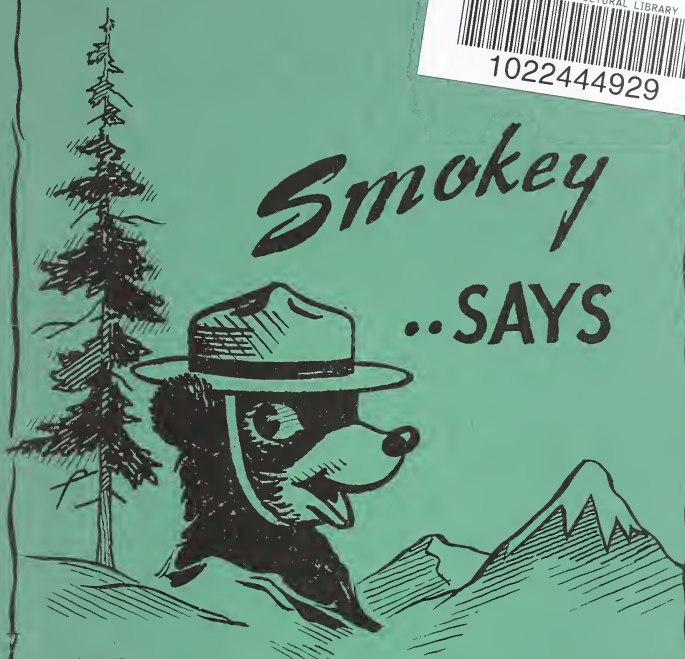




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# Smokey

## ..SAYS



### "REMEMBER THESE RULES"

1- Hold your match till its **COLD** — then pinch it to make sure.

2- Crush out your cigarette, cigar, and your pipe ashes. Then, when there is an ash tray, **USE IT!**

3- Drown your campfire and warming fire, then stir and drown again. If no water is available, stir with clean earth.

4- **DO NOT SMOKE ON TRAIL**—smoke only at rest stops or in camp.



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